

**Evaluating the Influence of Water Quality and
Tidal Restoration on Breeding Waterfowl
within the Terrestrial Food Web of the Suisun
Marsh**

Bruce E Wickland

Public Comments

No public comments were received for this proposal.

Technical Synthesis Panel Review

Proposal Title

#0141: Evaluating the Influence of Water Quality and Tidal Restoration on Breeding Waterfowl within the Terrestrial Food Web of the Suisun Marsh

Final Panel Rating
adequate

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

This proposal reflects the recurrent conflict between maintaining managed wetlands for more common species vs. restoring tidal wetlands for a few rare species. Much of waterfowl nesting habitat elsewhere in California (outside the Delta) has been destroyed. It would have strengthened the proposal to know what other waterbird and landbird species nest in the study area, to provide additional justification for this proposal that is focused mainly on one abundant species (Mallard). One reviewer comments that Mallards have been artificially increased in the Delta by water management, and perhaps other species more adapted to brackish habitats should be emphasized more. Focus on this abundant species may provide less justification for managed wetlands than they deserve in terms of the diversity of birds they support. At the same time, the larger sample sizes possible with Mallards may facilitate study of certain processes. Predictions are clear and testable (p. 8). However, details of study design (location of study sites, numbers of radios deployed, number of trap nights for small mammals, etc.) are not given. Mallards and other dabbling ducks mentioned nest mainly in uplands. In terms of water quality (the title of the proposal), proposed conversion of managed wetlands to tidal wetlands would affect mainly survival of ducklings after they

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move to wetlands. However, if duckling survival is to be measured by following radio-marked hens and ducklings, nests must be found and the hens and ducklings captured just after the ducklings hatch (both leave the nest shortly after hatching). Thus, nest searching and monitoring of nests in the uplands will be necessary. A strong point of this proposal is that it attempts to link several aspects of the terrestrial community to restoration activities in adjacent wetlands. The proposal states that there will be a minimum of 14 study sites, in uplands only, that are adjacent to tidal and managed marshes. The reader is referred to Fig. 2 for the study site locations, but these are not shown in the figure. The assumption seems to be that the abundance of nest predators in uplands differs depending on whether the uplands are adjacent to managed vs. tidal wetlands. No evidence or rationale is given for this idea, except to say that skunks are the main nest predator, and that skunks in the prairie pothole region "show a preference for wetland areas" (p. 7, par. 3). Because it is not uplands, but rather managed wetlands, that will be lost to tidal restoration, the pertinent question is, "Are skunk densities in uplands higher near managed wetlands than near tidal wetlands?" Some discussion of what constitutes "nearness" in terms of skunk home ranges or search patterns would help justify the location of study sites/experimental treatments (although the locations of study sites are not given). Likewise, densities of small mammals and mammalian predators will be estimated only in fields (uplands) (p. 11). The authors assume that CALFED restoration of managed marshes will affect the mammal populations in upland fields, but no reasons are given for why this would be the case. If there are good reasons, they should be stated clearly and perhaps considered in the study design. In short, this is an excellent proposal for studying effects of predators on Mallard nest success in uplands. The justification for that part of the study in the context of wetland restoration by CALFED is less clear. The part of the study most relevant to restoration of diked marshes by CALFED is habitat use by ducklings (which subsist in wetlands), but that part of the study receives less attention in the proposal. There is no mention of the different types of wetland microhabitats used by ducklings, the foods that might be provided by those microhabitats,

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invertebrate sampling in those microhabitats, or apparent growth rates of ducklings in different habitats. No behavior studies of duckling broods are planned to document or explain fine-scale habitat selection. Such studies would help elucidate the specific consequences to ducklings of converting managed to tidal wetlands.

Additional Comments:

Eadie, Kelt, and Takekawa ask for no salary, which is a substantial contribution to CALFED. Relative to expenses on other CALFED projects, the budget is quite reasonable.

This proposal reflects the recurrent conflict between maintaining managed wetlands for more common species vs. restoring tidal wetlands for a few rare species. Much of waterfowl nesting habitat elsewhere in California (outside the Delta) has been destroyed. It would have strengthened the proposal to know what other waterbird and landbird species nest in the study area, to provide additional justification for this proposal that is focused mainly on one abundant species (Mallard). One reviewer comments that Mallards have been artificially increased in the Delta by water management, and perhaps other species more adapted to brackish habitats should be emphasized more. Focus on this abundant species may provide less justification for managed wetlands than they deserve in terms of the diversity of birds they support. At the same time, the larger sample sizes possible with Mallards may facilitate study of certain processes. Predictions are clear and testable (p. 8). However, details of study design (location of study sites, numbers of radios deployed, number of trap nights for small mammals, etc.) are not given. Mallards and other dabbling ducks mentioned nest mainly in uplands. In terms of water quality (the title of the proposal), proposed conversion of managed wetlands to tidal wetlands would affect mainly survival of ducklings after they move to wetlands. However, if duckling survival is to be measured by following radio-marked hens and ducklings, nests must be found and the hens and ducklings captured just after the ducklings hatch (both leave the nest shortly after

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Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

Evaluating the Influence of Water Quality and Tidal Restoration on Breeding Waterfowl within the Terrestrial Food Web of the Suisun Marsh

The panel felt that this was a well-written proposal about predation not about water quality. The two external reviews associated with this proposal did not provide substantive information to justify their ranking. The relationship between the lead agency (NGO) and the University of California was not clearly presented; for example, in the production of reports. The proposal deals with an important conflict between maintaining managed wetlands for large numbers of wildlife or restoring them to tidal wetlands that benefit fewer rare species.

One reviewer questioned the study rationale because Suisun Marsh was not historically prime mallard habitat. Justification for the expectation that there will be increased predation after restoration was insufficient. That is, the expectation that water quality (salinity) changes are driving predation was not adequately described. The sampling design was not described in enough detail as well.

Food sources for ducklings should be investigated, but this was not proposed.

The reviewers felt that the proposal had a strong conceptual model.

One reviewer had a concern that change in the habitat quality may be greater in the non-breeding season than during the breeding season.

Rating: adequate

#0141: Evaluating the Influence of Water Quality and Tidal Restoration on Bre...

Technical Review #1

proposal title: Evaluating the Influence of Water Quality and Tidal Restoration on Breeding Waterfowl within the Terrestrial Food Web of the Suisun Marsh

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	Yes, I understood the motivation of the proposal clearly. The work proposed brings appropriate methods to bear on a topic of current concern, the effect of salinity changes on waterfowl breeding productivity.
Rating	excellent

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	Yes, the conceptual model does an excellent job of integrating current knowledge regarding waterfowl breeding and habitat changes. I was especially impressed with the integration of habitat dynamics, predator behavior, and alternative prey (small mammals) as drivers of duck breeding success.
Rating	excellent

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be

#0141: Evaluating the Influence of Water Quality and Tidal Restoration on Bre...

Technical Review #1

useful to decision makers?

Comments	The methodology appeared to me to be well-justified and likely to produce the desired data. The authors (especially Eadie and Ackerman) have histories of productivity of interest to a variety of constituencies, and this breadth of appeal will contribute to the novelty of their products. The desired information would certainly be useful to decision makers.
Rating	excellent

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	Yes. The methods appear to me to be sound and likely to produce the desired data. The investigators bring considerable appropriate experience in the area and with the species and methods of interest.
Rating	excellent

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	No experimental treatments are proposed as far as I could tell.
Rating	excellent

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the

Technical Review #1

project?

Comments	Yes (see above).
Rating	excellent

Additional Comments

Comments	The project as described seems like an excellent investment of resources, with information provided not just about waterfowl but also about associated species.
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	It is excellent. The group has appropriate experience and is well positioned to execute the described work.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	I saw no obvious problems with the budget.
Rating	very good

Overall

Provide a brief explanation of your summary rating.

Comments	The work proposed brings appropriate methods to bear on a topic of current concern, the effect of salinity changes on waterfowl breeding productivity. The investigators have the capability to execute the work.
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Technical Review #1

	I identified no significant short-comings in the proposal.
Rating	excellent

Technical Review #2

proposal title: Evaluating the Influence of Water Quality and Tidal Restoration on Breeding Waterfowl within the Terrestrial Food Web of the Suisun Marsh

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	It looks good to me.
Rating	very good

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	time frame .. trends in these factors is very important, and I perhaps missed how they were going to handle this.
Rating	very good

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	complete project... not particularly new approach, and I would have been much happier with an additional method, such as counts of nestlings fledged, that could give some index of critical values, to make sure
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Technical Review #2

	we are on the right track.
Rating	very good

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	very good.
Rating	excellent

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	see comment above for back-up
Rating	very good

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	Yes, this looks quite good.
Rating	excellent

Additional Comments

Comments

Technical Review #2

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	good
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	It is a complex proposal... but the costs to my mind are about twice too much; unless I am missing a multi-year effort that they are mounting.
Rating	good

Overall

Provide a brief explanation of your summary rating.

Comments	very good
Rating	very good

Technical Review #3

proposal title: Evaluating the Influence of Water Quality and Tidal Restoration on Breeding Waterfowl within the Terrestrial Food Web of the Suisun Marsh

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

	<p>The primary basis of this proposal is that tidal restoration of the Suisun Marsh will be harmful to resident breeding waterfowl-- principally mallards. The specific focus upon predator x prey interactions and impacts upon nesting waterfowl is an extension of work that has been done by Ackerman and others. The proposal is well written and clear in it's approach. However, the authors list 7 questions/critical unknowns, 3 major data gaps, and 5 objectives of the study. It would have simplified matters greatly if they would have generated 3-4 basis hypotheses that their study would revolve around.</p>
Comments	<p>As far as the overall idea goes, I have to question putting a significant investement into this study. Even as an external observer, it appears to me that this study is very narrowly focused (based upon the simplistic conceptual model that is provided and the "predicted" outcomes) and is concerned with a mallard population that is of only very local significance. In addition, the over-engineered nature of the wetland complex within the Suisun Marsh, has apparently, artificially expanded the mallard population in the first place. Historically, pintail, canvasback and wigeon (more brackish marsh acclimated species)were much more common than the freshwater obligate- mallard (Stoner 1937: Condor:242-248).</p>
Rating	

Technical Review #3

good

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	<p>The conceptual model is overly simplistic with predicted outcomes that only reflect common knowledge. Expanding the work on prey base abundance/diversity in relation to mallard numbers is interesting as an ecological framework. Being able to expand findings to a large scale restoration effort may be problematic. The underlying premise that higher salinity habitats = higher predator densities = lower abundance/diversity of small mammals = higher nest predation of mallards is reaching.</p> <p>I was troubled by the recurring inference of the authors that higher salinity tidal water is actually of lower water quality. For brackish-estuarine obligate marine species, I don't think these waters are of low quality. There was no mention of actual nutrient problems or other NPS issues. Also, on page 3 there is mention that salt marsh harvest mice avoid "hypersaline" conditions. According to the data in the proposal...by definition, no area of the Suisun has hypersaline (>36ppt) conditions nor will have them in the future. Also, on page 2, there is mention that the Suisun is the largest contiguous brackish wetland in the US...I tried to find a citation backing this up but couldn't.</p> <p>I would speculate that spatial and temporal habitat heterogeneity is fairly high and local scale species such as (<i>M. californicus</i>) and <i>Sorex</i> sp. occupy many of the appropriate structured habitats across the marsh system. It might be appropriate to do some pilot work in an area that represents an extreme gradient of</p>
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Technical Review #3

	salinities and concomitant vegetation communities. Simple ordination analysis of this pilot work would greatly inform how to expand the work to a large scale.
Rating	fair

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	Ok...let me start with the last question first. It's not appropriate for me to assess the political tone of this proposal. However, knowing the history of CWA and their mission, I know the focus here is on how to protect an existing resource that is very important to the CWA constituency. If the overall restoration is focused upon the variety of ecological systems and target species reliant upon those systems, then I'm not sure how useful this information will be to decision makers--I would guess, very little. The study, might be able to provide insight upon indirect effects of tidal restoration on a relatively small portion (
Rating	good

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	I have no doubt that these researchers have the abilities and expertise to carry out the approach and generate good data. Within the framework of their study, I would estimate a high likelihood of success. However, I must say I was not clear about the scope of
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Technical Review #3

	the study area. It was never clearly delineated-- they mentioned that Figure 1 delineated the 12 study sites...but I couldn't determine them. Also, it was not clear how the sites would be selected...how would they be stratified to ensure a random but valid representation of the entire system? This lack of clarity cast a cloud on the balance of methods that were actually clearly stated and well founded. Again, the scale issue is troubling...I think some pilot work should be done.
Rating	fair

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	It was not clear to me how the study would mesh with the timing of the restoration effort. Even as an in situ experiemental design, I was not clear (see above) about study site selection relative to the projected portion of the marsh targeted for restoration. As far as long term monitoring of mallard nest success and overall trends, I'm assuming that would continue regardless. No mention was made of previous small mammal monitoring or efforts to coordinate with past or present efforts.
Rating	fair

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	If the products of value are to be critical to evaluating the large scale effectiveness of restoration - No. If the project would scale down..and
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Technical Review #3

	include a pilot phase, there might be some interpretable outcomes. I don't believe contributions to a larger data management system would be meaningful. There's a decent chance, there would be 2-3 peer reviewed papers derived from this work.
Rating	fair

Additional Comments

Comments	The Suisun Marsh is an estuarine system that was created about 6000 years BC. Historically, this system was brackish in nature (Josselyn 1983: USFWS). The mallard is essentially a freshwater avian obligate and has been the beneficiary of the land use changes and hydrololical alterations in the region (Jensen and Chattin 1964). Will tidal restoration of a portion of the Suisun affect mallards? Probably...at a very local scale. Is it worth nearly \$700K to determine this...? In my opinion, no. From a waterfowl perspective the Suisun is most important for wintering populations.
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	I am familiar with several of the authors. I have no doubts that they could perform...it's just that I feel the approach needs scaling down...and from CalFed's perspective, the question of relevancy of this effort needs to be first and foremost.
Rating	very good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	
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Technical Review #3

	The budget seems high to me. Also..those indirect rates are way up there. There's no doubt that this project is very field study intensive. That requires a tremendous amount of effort, field equipment, and personnel.
Rating	fair

Overall

Provide a brief explanation of your summary rating.

Comments	My overall assessment of this proposal is that the focal species - mallard-- is the most abundant and adaptable species of waterfowl in the world. Investing a large of amount of effort into evaluating the impact of tidal flow restoration on this species may be an excercise of misplaced priorities. HOwever, the basic framework and experimental approach is sound (but see other comments). My basic recommendation would be to repackage the effort as a pilot study if mallards truly are a high priority species for the restoration plan.
Rating	fair